

# THREE SPECIES OF COLLEMBOLA FROM YUNNAN, SOUTHWEST CHINA (Apteygota)\*

TAMURA Hiro-shi ZHAO Li-jun

(Shanghai Institute of Entomology, the Chinese Academy of Sciences, Shanghai 200025)

**Abstract** Two new species and a known species of Collembola are described or re-described from Yunnan Province, southwest China, *Hypogastrura xiaoi* sp. nov., *H. zhangii* sp. nov. and *Paranurophorus simplex* Denis, 1928, respectively. The last species is the second record from China since 1928.

**Key words** New species, *Hypogastrura xiaoi*, *H. zhangii*, *Paranurophorus simplex*, Yunnan, China

Recently, three interesting collembolan species were found from Yunnan Province, southwest China, of which two are new species belonging to the genus *Hypogastrura* and one is a known species of the genus *Paranurophorus*. The two new species, *H. xiaoi* sp. nov., *H. zhangii*, were described in this paper. The known species is *Paranurophorus simplex* Denis, 1928, the type locality of which is Yunnanfu (Kunming-xian at present). This is the second record from China since the original description. This species is redescribed here, with some additional characters to the original description. The chaetal designation for the genus *Hypogastrura* is after Yosii (1956, 1960).

## 1 *Hypogastrura xiaoi* Tamura, sp. nov. (Figs. 1-13)

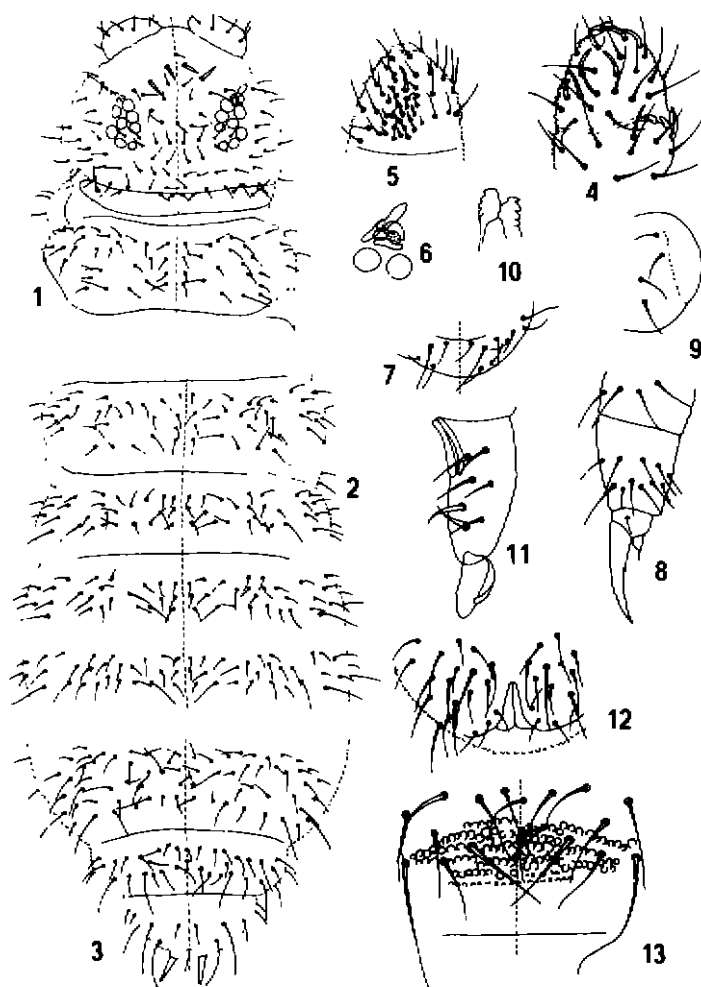
Body brownish grey with irregularly scattered blue black pigments, 616-1040  $\mu\text{m}$  [ $729.6 \pm 175.9 \mu\text{m}$  ( $\bar{x} \pm \text{SD}$ ,  $n=5$ )] long. Body laterally swollen at Abd. II and III, being narrower abruptly at Abd. V (Figs. 2 and 3).

Chaetotaxy: Setae all simple. Area frontalis with 2+2 spines at positions of  $d_3$  and  $sd_4$ , a median seta being between  $d_2$ - $d_2$  (Fig. 1). Th. I with 3+3 setae in a row; Th. II and III each with 4 rows of setae (Figs. 1 and 2). Abd. I-III each with 3 rows of

\* The present study is partly supported by the Grant-in-aid for the international Scientific Research Program No. 04041042 from the Ministry of Education, Science and Culture, Japan, and by the National Natural Science Foundation of China

本文 1997-03-28 收到, 1997-06-02 修回

setae;  $p_2$  and  $p_8$  longer (Fig. 2). Abd. IV clothed with 4 rows of setae;  $p_3$  and  $p_6$  longer (Fig. 3). Abd. V plurichaetotic; median setae existing in some specimens but not in others and chaetal arrangement mostly not symmetrical;  $p_4$  and  $p_6$  conspicuously long (Fig. 3). Seta  $a_1$  on Abd. VI shorter than anal spine except anal papilla (Fig. 3).



Figs. 1-13 *Hypogastrura xiaoi* Tamura, sp. nov.

1. head, Th. I and II; 2. Th. III-Abd. III; 3. Abd. IV-VI; 4. Ant. III and IV(dorsal); 5. Abd. IV(ventral); 6. PAO and nearest eyes; 7. labial triangle; 8. hind leg; 9. ventral tube; 10. tenaculum; 11. dentes and mucro; 12. anal lobes (ventral); 13. central part of Abd. IV(dorsal).

29.6  $\mu\text{m}$  long in holotype, with an inner tooth at middle; unguiculus short, being 0.27 in ratio to unguis, with basal lamella; clavate tenent hair absent (Fig. 8).

Abdomen: Ventral tube with 4+4 setae (Fig. 9). Tenaculum with 4+4 barbs (Fig.

Head: Head 64  $\mu\text{m}$  long in holotype. Antenna 1.8 times longer than head diagonal; length ratio of antennal segments I : II : III : IV as 1 : 1 : 1.6 : 1.8. Ant. IV dorsally with a retractile end-bulb in intersegmentary pocket and 7 blunt setae (Fig. 4) and ventrally with ca. 25 short, peg-like setae and a blunt sensory seta (Fig. 5). Ant. III apically with 2 bent, thick sensory rods and 2 guard sensilla (Fig. 4). Ant. II and I covered with 13 and 6 setae, respectively. Labral setae as 4/5, 4. Postantennal organ (PAO) with 4 tubercles arranged somewhat irregularly and a accessory tubercle, about 2 times as long as nearest eye (Fig. 6). Eyes 8+8 (Fig. 1). Labial triangle with 9+9 setae of which  $a_2$  is longest (Fig. 7).

Thorax: Leg I-III with 18 setae on tibiotarsus, 13 or 14 on femur and 7 on trochanter. Hind unguis

10). Dentes with 7 dorsal setae; mucro 0.5 and 0.7 times as long as dentes and unguis, respectively, with an outer lamella (Fig. 11). Anal spine long, being 0.8 and 1.1 in ratio to unguis and mucro, respectively (Fig. 3). On Abd. V, granules between  $p_1$ - $p_1$  ca. 11 in number (Fig. 13). Chaetal arrangement on anal lobes as in Fig. 12.

Holotype: A tropical rain forest dominated by *Barringtonia macrostachya*, *Ficus vasculosa*, etc., 600 m alt., Xishuangbanna, Yunnan Province, southwest China, 28-X-1992, H. Tamura and L. Zhao leg. Paratype: 4, same data as for holotype. The holotype and 3 paratypes are preserved in Shanghai Institute of Entomology, the Chinese Academy of Sciences and one paratype in the collection of the senior author.

Etymology: This species is dedicated to Dr. N. Xiao, Kunming Institute of Zoology, the Chinese Academy of Sciences, who kindly guided us around the study area.

Remarks: This species is closely related to *H. horrida* Yosii, 1960 in having 2+2 cephalic spines, but differs from the latter by quite different chaetotaxy and short unguiculus in proportion to unguis (chaetotaxy conspicuously irregular and unguiculus half as long as unguis in *horrida*). Its chaetotaxy is stable except the cases on Abd. V and sometimes on Abd. IV in comparison with *horrida*.

## 2 *Hypogastrura zhang* Zhao, sp. nov. (Figs. 14-25)

Body 712  $\mu$ m long in holotype. Color brownish grey, being pale except head and antennae.

Chaetotaxy: Setae all simple. Head chaetal arrangement as in Fig. 14; a median setae being between  $d_2$ - $d_2$ . Th. I with 3+3 setae in a row (Fig. 15). Th. II and III each with 3 rows of setae;  $p_2$  longer than  $p_1$  (Fig. 15). Abd. I-III each covered with 2 rows of setae, lacking  $p_3$  setae; Abd. II with 1+1 microsensilla at position of  $p_5$  (Figs. 17 and 18). Abd. IV mediolaterally clothed with 2 rows of setae, laterally with 3 rows;  $p_2$  longer than  $p_1$  (Fig. 16). Abd. V with 2 rows of setae;  $p_1$  longer than  $p_2$ ;  $p_3$  and  $p_5$  also longer (Figs. 16 and 24). Setae  $a_1$  on Abd. VI longer than anal spines (Figs. 16 and 24).

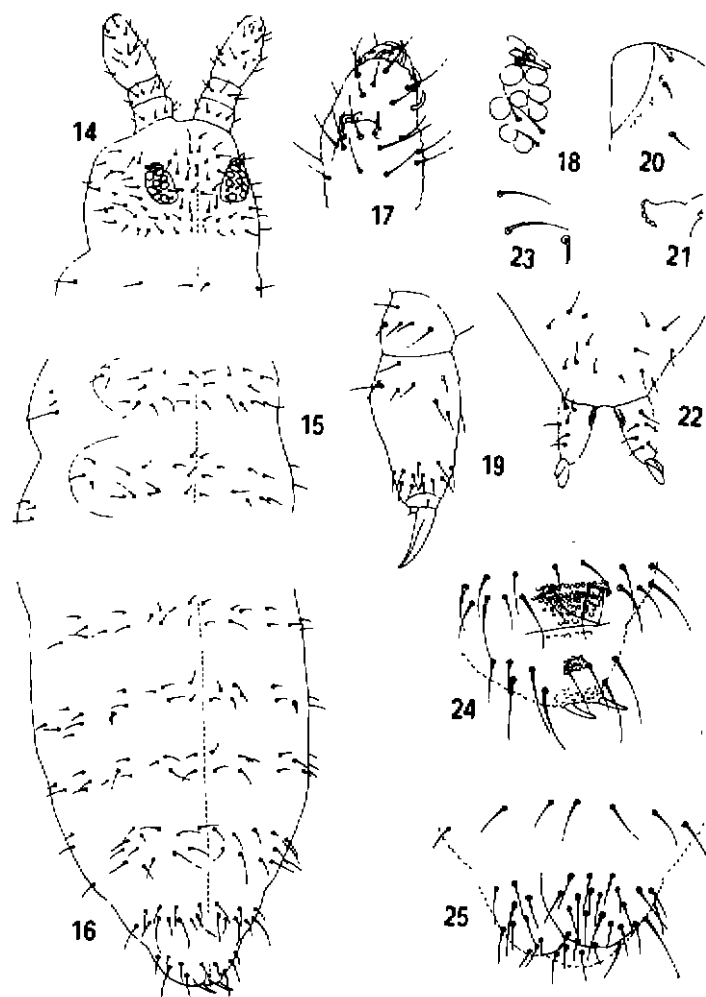
Head: Head 140  $\mu$ m long in holotype. Antennae as long as head diagonal (Fig. 14); length ratio of antennal segment I : II : (III+IV) as 1 : 1 : 3. Ant. IV with a retractile end-bulb in integumental pocket and 5 blunt setae (Fig. 17). Ant. III apically 2 bent, short sensory rods and 2 guard sensilla (Fig. 17). Ant. II and I covered with 8 and 7 setae, respectively. Postantennal organ with 4 tubercles and an accessory tubercle, about 2.3 times as long as nearest eye (Fig. 18). Eyes 8+8 (Fig. 18).

Thorax: Leg I-III each with 16 setae on tibiotarsus, 11 on femur and 5 on trochanter. Hind unguis 24.5  $\mu$ m long in holotype, without inner teeth; unguiculus short, being 0.33 in ratio to unguis, with basal lamella; clavate tenent hair absent (Fig. 19).

Abdomen: Microsensilla on Abd. II half as long as nearest seta (Figs. 16 and 23). Ventral tube with 3+3 setae (Fig. 20). Tenaculum with 5+5 barbs (Fig. 21). Dentes with

6 dorsal setae of which most proximal one is longest; mucro 0.46 and 0.78 in ratio to dentes and unguis, respectively, with basal lamella (Fig. 22). Anal spines moderately long, being 0.76 and 1.0 in ratio to unguis and mucro, respectively (Figs. 16 and 24). On Abd. V, granules between  $p_1$ - $p_1$  6 or 7 in number (Fig. 24). Chaetal arrangement on anal lobes as in Fig. 25.

**Holotype:** A tropical rain forest dominated by *Pometia tomentosa*, *Cryptocarpa yunnanensis*, etc., 550 m alt., Xishuangbanna Tropical Botanical Garden, the Chinese Academy of Sciences, Yunnan Province, southwest China, 28-X-1992, H. Tamura and L. Zhao leg. The holotype is deposited in Shanghai Institute of Entomology, the Chinese Academy of Sciences.



Figs. 14-25 *Hypogastrura zhangi* Zhao, sp. nov.

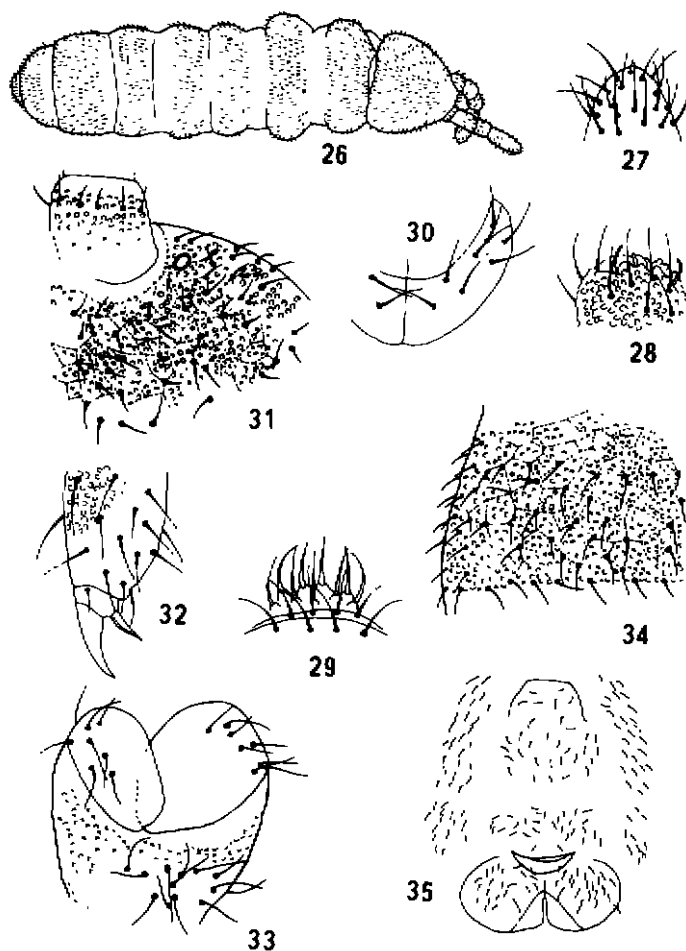
14. Head and Th. I; 15. Th. II and III; 16. Abd. I-VI; 17. Ant. III and IV; 18. PAO and eye field; 19. hind leg; 20. ventral tube; 21. tenaculum; 22. dents; 23. microsensillum and nearest setae on Abd. II (right); 24. enlarged Abd. V and VI; 25. abdominal end (ventral).

**Etymology:** The new species is dedicated to Prof. H. Zhang, Kunming Branch of the Chinese Academy of Sciences who in advance negotiated with the concerning organizations to make our field survey easy.

**Remarks:** Only the holotype was collected, but characters can be clearly observed. The present species is distinctly separable from the other congeneric species so far known in possessing 5 barbs on tenaculum and 1+1 microsensilla on Abd. II. This species is somewhat similar to *H. sinetertiaseta* Lee, 1974 from Korea in chaetotaxy, but differs from the latter in the characters mentioned above.

### 3 *Paranurophorus simplex* Denis, 1928 (Figs. 26–35)

*Paranurophorus simplex* Denis, 1928, Boll. Lab. Zool. Portici 22: 167.



Figs. 26–35 *Paranurophorus simplex* Denis, 1928

26. habitus; 27. distal part of Ant. IV; 28. apical portion of Ant. III; 29. labral setae; 30. labial triangle; 31. anterolateral part of head (right); 32. hind leg; 33. ventral tube; 34. lateral portion of Abd. III (left); 35. ventral abdominal chaetal arrangement of Abd. II–V.

*Paranurophorus armatus* Stach, 1947, Acta monogr. Mus. Hist. nat. Kraków. Isotomidae: 93.

*Paranurophorus simplex*: Palissa, 1964. Tiewelt mitteleuropas 4: 147.

Body white or creamy-white, 1100–1740  $\mu\text{m}$  [ $1401.8 \pm 173.5 \mu\text{m}$  ( $\bar{x} \pm \text{SD}$ ,  $n=11$ )] long. Thoracic II and III tergites conspicuously protruding laterally (Fig. 26). Setae all simple, short; macrochaeta not differentiated. Integument covered with coarse granules over whole body (Figs. 31–34). Polygonal reticulation present on allover integument, especially distinct in fresh material (Figs. 31 and 34).

Head: Head 256  $\mu\text{m}$  long in hypotype. Antenna about as long as head; length ratio of antennal segments I : II : III : IV as 1 : 1.5 : 1.5 : 3.0. Ant. IV apically without sensory knobs (Fig. 27). Ant. III apically with 2 slightly bent sensory rods and 2 guard sensilla (Fig. 28). Labial setae as 4 / 4, 5, 4 (Fig. 29). Labial triangle covered with 8+8 setae subequal in length (Fig. 30). Postantennal organ present just behind antennal basis, broadly-elliptical or nearly circular, shorter than neighboring setae (Fig. 31). Eyes absent.

Thorax: Hind unguis 30  $\mu\text{m}$  long in hypotype, untoothed; unguiculus about half as long as unguis, without basal lamella (Fig. 32). Clavate tenent hairs absent (Fig. 32).

Abdomen: Tergites not conspicuously protruding laterally (Fig. 26). Abd. IV 1.3 times as long as III. Abd. VI somewhat bending ventrally. Ventral tube with 8+8 distal lateral setae and ca. 13 setae on posterior face (Fig. 33). Ventral setae on Abd. II–V as in Fig. 35. Rudimental furca indistinct (Fig. 35). Tenaculum and anal spines absent.

Material examined: Eleven, from leaf litter of a forest (1540 m alt.) dominated by *Platanus* sp. in Wenshan, southeast Yunnan, southwest China, N. Xiao leg. Hypo-type is housed in Shanghai Institute of Entomology, the Chinese Academy of Sciences.

Remarks: The present material well agrees with Denis (1928) so far as his characters concern. The type locality of the species is recorded as “Yunnanfu, Yunnan” corresponds to the present Kunming-xian, an eastern part of Yunnan Province, with Kunming City as its capital (Zhang, 1982). The present material was collected from a forest at Wenshan City about 500 km southeast of Kunming City, being situated rather near the border to Vietnam.

Stach (1947) has described *P. armatus* based on specimens collected in Poland, with a stress on a small difference in a rudimentary furca. But the furca itself is indistinct, so far we examined the present material. Palissa (1964) synonymized *P. armatus* Stach with *P. simplex* Denis.

Stach (1947) noted that “All the numerous specimens of this species were collected only in a flower-pot (a palm) in one dwelling. It is questionable if this species could live also in free nature in Poland.”, suggesting a probability that the species was imported to Poland with some exotic plants. *Paranurophorus simplex* is known only from Yunnan, except Poland, without no records in other Southeast Asian countries, and Yunnan Province has natural vegetations of palm-trees. Under these circumstances, the

*Paranurophorus* animals in Poland might be possibly introduced from some places of Yunnan Province, southwest China.

This is the second record of the species in China since Denis's original description in 1928.

### References

- Denis A. 1928. Notes sur les Collembola récoltés dans ses voyages par la Professeur F. Silvestri. *Boll. Lab. Zool. Portici*, 22: 169-179.
- Lee B H. 1974. Étude de la faune coreenne des insectes Collembolés II. Description de quatre espèces nouvelles de la Family Hypogastruridae. *Nouv. Rev. Ent.*, 4: 89-102.
- Palissa A. 1964. *Insekten 1. Teil apterygota*. In: Brohmer P. (ed.), *Die Tierwelt mitteleuropas*, Leipzig: Verlag von Quelle & Meyer. 1-407.
- Stach J. 1947. The Apterygotan fauna of Poland in relation to the world-fauna of this group of insets. Family Isotomidae. *Panstwowe Wydawnictwo Naukowe*, Kraków, Cracow. 1-488.
- Yosii R. 1956. Monographie zur Höhlencollemboles Japans. *Contr. Biol. Lab. Kyoto Univ.*, 3: 1-109, 50 pls.
- Yosii R. 1960. Studies on the collembolan genus *Hypogastrura*. *The Amer. Midland Naturalist*, 64: 257-281
- Zhang L. 1982. A great geographical dictionary of ancient and modern place names of China. Shanghai. The Commercial Press, 1-1410 (in Chinese).

(153-154)

## 云南省三种弹尾目昆虫

(无翅亚纲)

田村浩志 赵立军

(中国科学院上海昆虫研究所 上海 200025)

**摘要** 本文记述了云南省弹尾目昆虫 2 新种, 重新描述了 1 已知种: 萧氏球角跳 *Hypogastrura xiaoi* sp. nov., 张氏球角跳 *H. zhangii* sp. nov. 和简近缺跳 *Paranurophorus simplex* Denis, 1928。简近缺跳是中国自 1928 年以来的第 2 次记录。

**关键词** 新种, 萧氏球角跳, 张氏球角跳, 简近缺跳, 云南, 中国

**中图分类号** Q969.14

Q969.152